

Placing Economic Values on Once-Through Cooling Impacts

Robert Unsworth
Industrial Economics, Incorporated

Overview of Economic Impacts

- Given the substantial cost of switching to alternative cooling methods or retrofitting existing cooling systems, it is reasonable to consider the magnitude of economic benefit that might result from such requirements.
- Despite more than two decades of research regarding the ecological impacts of various cooling technologies, no monetary measure of the ecological impacts of once-through cooling exists. In short, we know far more about the costs of potential alternative technologies than their benefits.

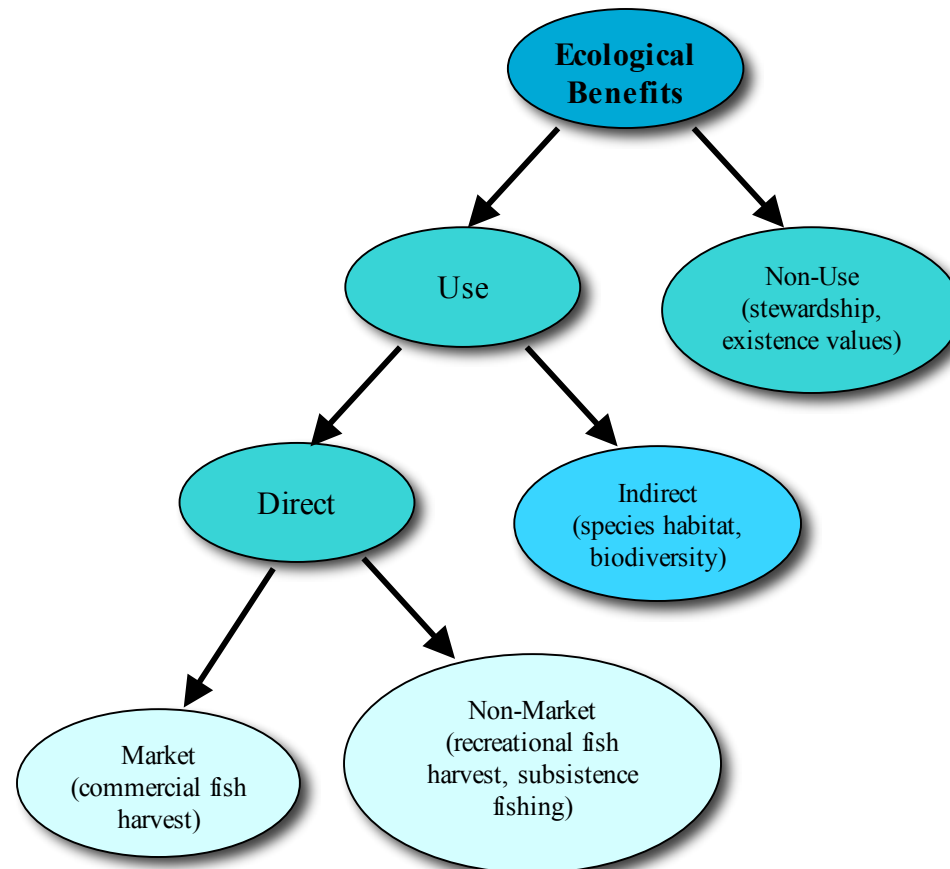
Overview of Economic Impacts

- Past analyses have generally focused on easily valued categories of impact (e.g., recreational and commercial fishing losses), or on generating cost estimates for projects intended to off-set expected biological impacts (e.g., wetlands construction to enhance fish populations).
- No analyses have estimated the *total value* of ecological change associated with once-through cooling.
- In addition, the standards of economics have not been consistently applied in past analyses.

Services Provided by Natural Resources

- In placing values on ecological change, economists think in terms of the “services” provided by natural resources.
- A variety of taxonomies exist that can be used to describe the services provided by natural resources.

Categorization of Natural Resource Services



Valuation Methods

- Economists and policymakers have available a number of well-accepted and widely applied techniques to place values on environmental services.
 - Market methods
 - Revealed preference
 - Stated preference

Valuation Methods

- These methods can be applied through primary research or through secondary approaches (i.e., benefits transfer from existing studies)
- Despite the availability of these tools, no research exists regarding the *total value* the public holds for avoiding the ecological impacts of once-through cooling.

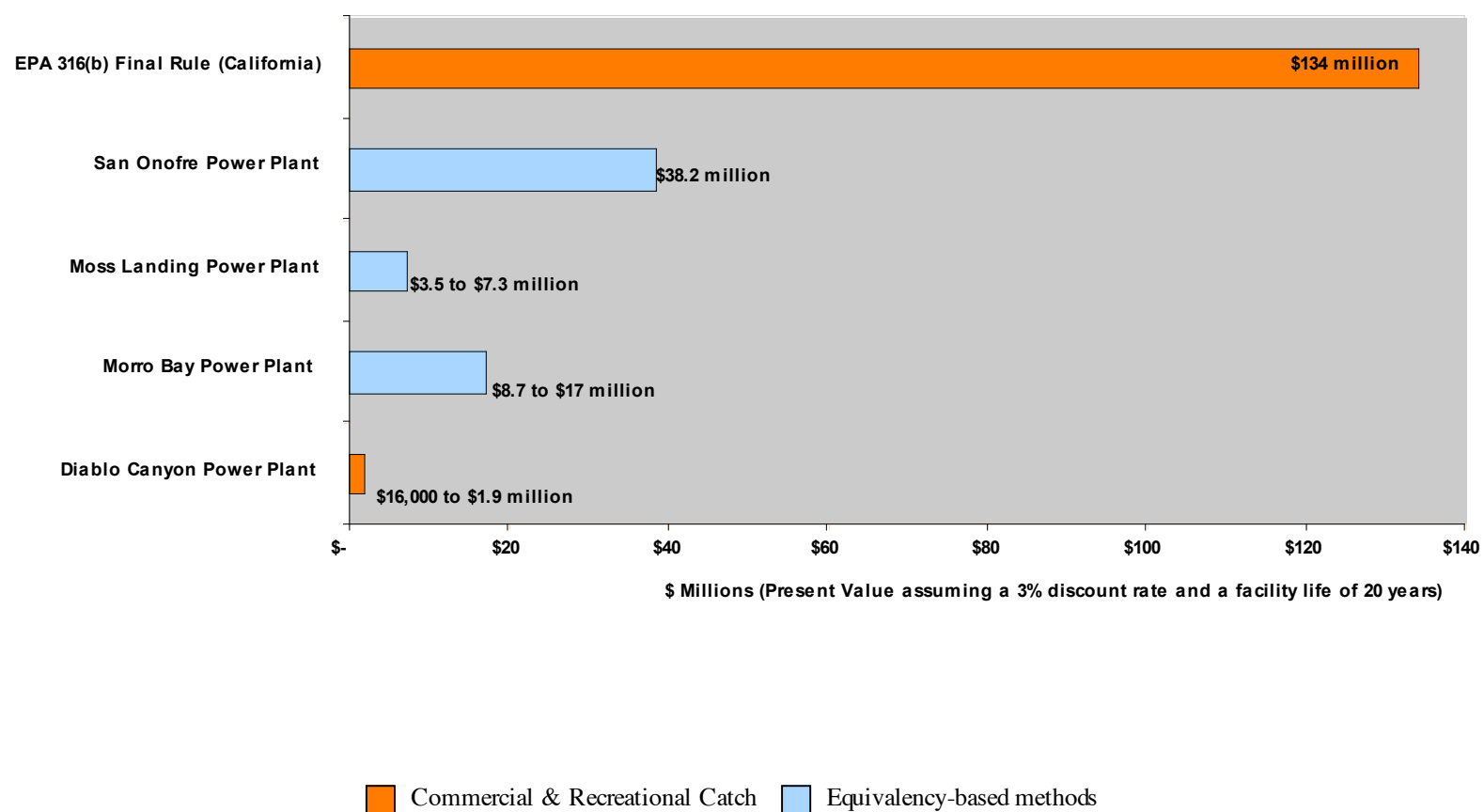
Equivalency Based Techniques

- Recently, emphasis has been placed on the use of equivalency-based approaches (e. g. Habitat Production Foregone, Habitat Equivalency, etc.).
 - *What are equivalency-based approaches?*
- Past applications of equivalency-based approaches have implicitly or explicitly assumed that the ecological and human use impacts associated with once-through cooling can be “valued” based on the cost of projects designed to off-set these impacts.
 - *Is the public’s willingness to pay for these environmental off-sets greater than the cost of these actions?*

Equivalency Based Techniques

- While not capable of generating a measure of the value the public places on efforts to reduce the impact of once-through cooling, equivalency approaches have the potential to provide a sound means to establishing the scale of required restoration to off-set the impacts of once-through cooling.

Recent Studies of Once-Through Cooling Impacts



Economic Benefits

- So what is the economic value of the ecological impacts of once-through cooling in California?
 - *Can we transfer estimates from existing site-specific research?*
 - *Can we apply the models and approaches developed by EPA's Section 316(b) program?*
 - *Can we apply environmental enhancement cost estimates (e.g., equivalency based approach)?*

Economic Benefits

- Based on existing information, it is not possible to confidently establish the total economic benefit associated with requirements to reduce once-through cooling.

Conclusions

- Methods exist to assign economic values to once-through cooling impacts.
- However, past analyses have focused on limited benefit categories and/or do not meet the standards for economic analyses of this type.
- Equivalency approaches have the potential to provide a sound means to establishing the scale of required restoration to off-set the impacts of once-through cooling, but not a measure of the public's willingness-to-pay for reducing such impacts.
- Any future economic analysis will only be as good as the underlying biological data.

Moving Forward

- Conduct primary research on the public's willingness to pay to avoid the ecological impacts of once-through cooling.
- Establish standards for use of equivalency based approaches, including detailed guidance on minimum data requirements.